**CSCI414/514 Group Project (Group 8)**

**Database to track student records in a University**

A university registration system needs to keep track of courses and their sections, students, and records the information of students registered for a section (with grades, if any). We can add/remove courses, add/remove sections of courses, add/remove students, (de)register students in sections. Information about students includes personal information (name, address etc), and a studentID. Every course has a name, number of associated credits, and an ID which consists of a rubric (e.g., MATH, CSCI etc) and a number. Every section has an ID, semester (Fall, Spring or Summer), and is associated with a particular course. The system should be able to answer queries like:   
*Find all sections of MATH 271 offered in 2024  
Find all courses taken by John Doe*

**Question 1:** What are the nouns that you can find in the above requirements? Which ones of these are primary entities? For each noun, explain what role it plays. Construct an entity-relationship diagram for the system.

* **Primary - Course** (Represents the academic subjects offered by the university)
  + **ID** (Unique identifier for courses and sections)
    - **Rubric** (e.g., MATH, CSCI)
    - **Number**
  + **Name** (Plain text identification of course)
  + **Number of Credits** (The number of credits a student earns for passing the course)
* **Primary - Section** (Represents specific instances of courses offered in different semesters)
  + **ID** (Unique identifier for courses and sections)
  + **Semester** (Time when the section is offered. Fall, Spring or Summer)
  + **Course** (Associated course for the section)
* **Primary - Student** (Represents individuals enrolled in the university)
  + **StudentID** (Unique Identifier, Part of the personal information of students)
  + **Name** (Part of the personal information of students)
  + **Address** (Part of the personal information of students)
* **Associative - Grades** (Represents the performance of students in sections)

A diagram of a graph

AI-generated content may be incorrect.

A diagram of a course

AI-generated content may be incorrect.

**Question 2:** Make a list of all the CRUD operations needed to operate this system. What are the tables that you will need to build a database for this problem, that is in First Normal Form (1NF)? What fields would you include in each table, assuming that you want to make things simple/easy and not worry about redundancy?

**Question 3:** For each operation, explain how it can be carried out using standard SQL commands in the 1NF design.

**Question 4:** Is your design in Second Normal Form (2NF)? Explain why. Redesign your schema to make it 2NF compliant. For each operation, explain how it can be carried out using standard SQL commands in the 2NF design.

**Implementation.** This be implemented using Sqlite, Python, HTML and Javascript in the Flask framework on Github.

**Due dates:  
Answers to questions in D2L dropbox (1 per group): March 22.  
Phase 1 of implementation: April 8.** In this phase, we implement the operations for add student, add course and add section, and queries to test that these are done correctly (list all students, list all courses in a given rubric, list all sections of a course) **Final implementation: April 25.** In this phase we implement the other operations, register a student in a section, get a list of all students in a section. Get a list of all courses a student has registered for.

**Extra Credit.** This includes things like assigning grades for each student for a section, generate a student’s transcript etc.

**How to submit:** Answers in dropbox in D2L. For implementation, form groups in Github assignment link. For Phase 1 implementation, make a video with clear oral narrative and testing of all features and post link in D2L. For Phase 2 implementation you will need to submit a report and a link to a video. Video should have a clear oral narrative and testing of all features and post link in D2L. (One video per group for both phases). All students should submit a report describing their experience with the project, what they learned from it (technical as well as soft skills) and what percentage of the project effort was their contribution. Note that the percentages for each group should add up to 100, so please discuss with each other.